

**Original contribution**

Undiagnosed fatal malignancy in adult autopsies: a 10-year retrospective study



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Summary Autopsies reveal undiagnosed malignancies even in this era of modern diagnostic imaging and ancillary laboratory studies. The incidence of clinically undiagnosed malignancies related to primary cause of death in a university hospital setting has rarely been studied. Our objective was to determine the incidence of clinically undiagnosed fatal malignancies in an urban teaching hospital and to assess whether this incidence was influenced by the duration of hospital stay. We performed a retrospective analysis of consecutive adult hospital autopsies in which the primary cause of death was related to undiagnosed malignancy. The detailed autopsy report, clinical records, and relevant laboratory results from laboratory and hospital databases were reviewed. Eight hundred twenty-one adult autopsies were performed over 10 years. Sixty-nine clinically undiagnosed malignant neoplasms were found in 66 cases (8%). In 26 of these 66 cases, the undiagnosed malignant neoplasm was related to the primary cause of death (3.1%). The duration of hospital stay was less than 24 hours in 8 cases (30.7%), 2 to 7 days in 9 cases (34.6%), and greater than 7 days in 9 cases (34.6%). In 10 of these 26 cases (1.2%), there was suspicion of malignancy without definitive tissue diagnosis, and the average hospital stay was 4.9 days. In 16 (1.9%) of these 26 cases, malignancy was not clinically suspected, and the average hospital stay was 9.9 days. We conclude that despite the recent advances in diagnostic imaging and laboratory techniques, a subset of adult autopsies (3.1%) performed in an urban university hospital have clinically undiagnosed malignancy related to the primary cause of death. Malignancy was not clinically suspected in 1.9% of these cases. There is a need to conduct comprehensive “root cause” analysis in these cases for improvement of clinical care.

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1. Introduction

Autopsy rates have declined since reaching their peak during the middle of the last century. The causes for this decline include lack of reimbursement and revocation of the

requirement to perform a minimum number of autopsies for institutional accreditation by the Joint Commission in 1971. Another important reason is the widespread availability of modern diagnostic imaging and ancillary laboratory tests, especially since the 1980s. Ironically, studies have shown that despite the advancement in imaging and laboratory techniques, the rate of discrepancy between clinical and autopsy diagnoses remains similar across different decades [1]. Most of the studies performed in the past have concentrated on the overall discrepancy between clinical and autopsy diagnoses [2–6]. The incidence of clinically

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missed malignant neoplasms (including both incidental malignancies and those causing death) has been reported to range from 11% to 42% in various studies [2]. To our knowledge, only 2 prior studies have focused on undiagnosed malignancies as a primary cause of death: one by Sens et al [7] in a largely forensic autopsy setting and the other by Sarode et al [8] in a hospital setting. The present study explores the incidence of clinically undiagnosed fatal malignancies revealed by hospital autopsy in an adult

population. The setting of this study was an urban teaching hospital in the first decade of the present century.

2. Materials and methods

Approval from an institutional review board was obtained to carry out the present study. The study involved retrospective analyses of consecutive adult hospital autopsies

Table 1 Summary of patients with no suspicion of malignancy

Case no.	Age (y)	Sex	Clinical cause of death	Malignant neoplasm	Primary organ	Autopsy cause of death (immediate)	Relevant imaging studies done	Hospital stay (d)
1	62	M	Rhabdomyolysis Pneumonia Ventricular fibrillation	Squamous cell carcinoma	Lung	Pulmonary Hemorrhage	CXR	4
2	85	M	Respiratory distress	Squamous cell carcinoma	Lung	Acute Bronchopneumonia	CXR, CT angiogram	30
3	55	F	Pulseless electrical activity	Squamous cell carcinoma	Lung	Acute bronchopneumonia	CXR	2
4	58	M	Pulseless electrical activity	Squamous cell carcinoma	Lung	Pulmonary hemorrhage Acute bronchopneumonia	–	1
5	86	M	Pneumonia	Adenocarcinoma	Lung	Pulmonary hemorrhage Acute bronchopneumonia	CXR	2
6	67	F	Pneumonia	Adenocarcinoma	Lung	Acute bronchopneumonia Diffuse alveolar damage	CT thorax	19
7	74	M	Hypotension Metabolic acidosis	Small cell carcinoma	Lung	Disseminated intravascular coagulation	CXR	3
8	67	F	Acute respiratory distress	Mixed small cell/large cell carcinoma	Lung	Acute bronchopneumonia	CXR	4
9	56	M	Multiorgan failure	Diffuse large B-cell lymphoma (EBV positive)	Lung	Acute bronchopneumonia	CT thorax	57
10	73	M	Shock Multiorgan failure	Diffuse large B-cell lymphoma	Lymph node	Pseudomembranous colitis	CT abdomen	9
11	59	F	Myocardial infarction	Adenocarcinoma	Gallbladder	Acute myocardial infarction with cardiac tamponade Disseminated intravascular coagulation	–	3
12	69	F	Cerebrovascular accident Perforation of GI tract	Adenocarcinoma	Colon	Perforation of colon Acute peritonitis	CXR	1
13	59	M	Disseminated intravascular coagulopathy Respiratory distress Renal failure	Polymorphic B-cell lymphoma (EBV positive)	Lymph node	Disseminated intravascular coagulation	–	8
14	67	F	Pulseless electrical activity	Invasive ductal carcinoma	Breast	Disseminated intravascular coagulation	–	1
15	63	F	Respiratory failure	Sarcoma	Pleural cavity	Acute bronchopneumonia	CT thorax	10
16	46	F	Cerebrovascular accident Thrombotic thrombocytopenic purpura	Serous carcinoma	Ovary	Disseminated intravascular coagulation Acute cerebral infarction	–	5

Abbreviations: CXR, chest x-ray; CT, computed tomography; EBV, Epstein-Barr virus; GI, gastrointestinal.

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